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In conclusion, it must be stated that notwithstanding the complexity of the problems discussed and the minute analysis to which they are subjected, the book is written with a rare degree of conciseness and lucidity. Professor Giglio Tos has certainly presented a somewhat abtruse subject in a most interesting manner and has given a new point of view, a working hypothesis which cannot fail to influence future cytological work. The book is suggestive from cover to cover, and the second volume, which is to treat of 'Ontogenesis and its Problems,' will be awaited with interest.

J. P. McM.

A. de Bary's Vorlesungen über Bakterien. Dritte Auflage. Durchgesehen und teilweise neu bearbeitet. Von W. MIGULA. Leipzig, Wilhelm Engelmann. 1901. Mk. 3.60.

The name of DeBary's 'Lectures on Bacteria' still has power to conjure up pleasant memories in those persons who remember when this classic brochure was the only worthy book devoted exclusively to the young science of bacteriology. The ponderous tomes, too often filled with unassimilated facts, that have since appeared in abundance sometimes force us to recall with regret the days when selection of material and skilled exposition were not incompatible with completeness.

The attempt to put new wine into old bottles has always encountered certain experimental difficulties, and it cannot be said that these difficulties have been altogether overcome by Dr. Migula, although something of the charm of the original lectures has been retained. The general arrangement of the sections is the same as in the original edition, while the insertion of new facts and the dropping of outworn creeds is perhaps as skilfully carried out as could be expected. In spite of the defects to be anticipated in a rewritten work of this sort, the lectures will readily command interested readers. It will always be questioned, however, whether the successive changes in the viewpoint of a rapidly growing science do not continuously demand new methods of exposition, and whether it is quite fair to a book that has served well its day and generation to bring it again upon the stage.

E. O. J.

A Laboratory Guide in Elementary Bacteriology. By WILLIAM DODGE FROST, Instructor in Bacteriology, University of Wisconsin. Published by the Author, Madison, Wisconsin, 1901.

The development of bacteriology as a subject of general scientific importance has led in several American universities to the introduction of courses in bacteriology into the regular undergraduate curriculum, and has created a demand for a kind of laboratory training adapted to the requirements both of the college student and of the student of medicine. The book before us outlines a course of this character, elaborated during several years of experience at the University of Wisconsin. The arrangement and choice of matter will be generally commended. The ordinary technical procedures are lucidly described with the aid of many diagrams, and are in thorough accord with the latest and best practice. The book is not distorted by being wrested to special utilitarian ends, but is rather designed to lay a broad foundation for subsequent specialization in any branch of bacteriology. It is admirably fitted for this purpose.

E. O. J.

Elements of Quaternions. By the late SIR W. R. HAMILTON. Second edition. Edited by PROFESSOR C. J. JOLY. London, Longmans & Co. Vol. I., pp. xxxiii + 583; Vol. II., pp. liv + 502; quarto.

The first edition of the 'Elements of Quaternions' consisted of 500 copies; and as many of these were presented to men of science, the book soon became scarce on the market. The published price was one pound; five times that amount has been paid for a single copy. In fact it frequently happened that a student could not obtain a copy of the English edition, and was obliged to content himself with Glan's German translation. Therefore we hail with pleasure a second edition of this classic of the mathematics, especially as it is printed in two handsome quarto volumes, and can be purchased at a moderate price.

Hamilton spent the last seven years of his life in the preparation of the 'Elements,' which he designed to be the *Principia* of space-analysis. He did not live to see them published.